STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

STAFF SUBMITTAL

for the meeting of the
COMMISSION ON WATER RESOURCE MANAGEMENT

December 21, 2011
Honolulu, Oahu

Turtle Bay Resort, LLC
APPLICATION FOR A WATER USE PERMIT
Opana 1 & 3 Wells (Well No. 4100-04 & -05), TMK (1) 5-7-002:019, WUP No. 927
Existing (Domestic / Municipal) Use for 0.346 mgd
Koolauloa Ground Water Management Area, Oahu

APPLICANT:

Turtle Bay Resort, LLC
57-091 Kamehameha Highway
Kahuku, HI 96731

LANDOWNER:

Same

SUMMARY OF REQUEST:

The applicant requests that the Commission on Water Resource Management (Commission) approve a water use permit for an allocation of 0.346 million gallons per day (mgd) of potable confined ground water from two existing wells to supply various existing potable domestic, municipal, and sewage treatment plant uses that are currently supplied by the Board of Water Supply's Waialee System.

LOCATION MAP: See Exhibit 1

BACKGROUND:

On September 15, 2011, a completed water use permit application was received from Turtle Bay Resort, LLC by the Commission. Additional information regarding the source, use, notification, objections, and field investigation(s) is provided in Attachment A.

ANALYSIS/ISSUES:

Section 174C-49(a) of the State Water Code establishes seven (7) criteria that must be met to obtain a water use permit. An analysis of the proposed permit in relation to these criteria follows:

(1) Water availability

Through the Hawaii Water Plan, Water Resource Protection Plan (WRPP), the Commission has adopted 36 mgd as the sustainable yield for the **Koolauloa** Aquifer System Area. Individual existing water use permits in this aquifer system area are shown in Exhibit 2. A summary of the current ground water conditions in the aquifer is provided in Table 1:

Table 1. Koolauloa Aquifer System Area

ITEM	**Koolauloa** Aquifer System Area (mgd)
Sustainable Yield	36
Less: Other Existing Water Use Permits (shown in Exhibit 2)	18.572
Reservation to DHHL	0
Subtotal (Current Available Allocation)	17.428
Less: Other Completed Applications	none
Less: This Application	0.346
Subtotal (Potential Available Allocation/Allocation Deficit)	17.082

Therefore, there is adequate water available to accommodate the requested amount.

(2) Reasonable-beneficial

Section 174C-3 HRS defines "reasonable-beneficial use" is

"...the use of water in such a quantity as is necessary for economic and efficient utilization, for a purpose, and in a manner which is both reasonable and consistent with the state and county land use plans and the public interest".

I. Purpose of Use

The applicant is requesting the use of potable water to supply municipal, domestic and industrial uses. The Declaration of Policy section, §174C-2(c) HRS, states that the Water Code shall be liberally interpreted to obtain maximum beneficial use of the waters of the State for various purposes including these uses.

II. Quantity Justification

The applicant is requesting a total of 0.346 mgd for domestic, municipal and industrial uses. A breakdown of the applicant's uses is shown in Exhibit 3. The quantities applied for are the same as the estimates of average daily demand provided in Table 15: Domestic Consumption Guideline, in the Departments of Water Supply's Water System Standards.

The last three items were estimated based on actual metered usage. These uses include restroom facilities, a maintenance facility and a sewage treatment plant. Duties for these types of uses are not readily available. However, the requested allocation for these applications only amount to 0.021 mgd, which is 6% of the total applied amount. Further, these amounts were metered actual usage and should therefore be accurate. Finally, if these numbers are too high, the Commission can always revoke for 4-years of unused water.

Therefore, the quantities requested by the applicant appear to be reasonable.

III. Efficiency of Use

The applicant states that its operations are as water efficient as possible because the uses are consistent with BWS water usage standards.

IV. Analysis of Practical Alternatives

The applicant has addressed alternatives to the proposed use of fresh confined water as described below:

1. Municipal supply – the municipal supply is the current source of water for this application. Since the Waialee system is at full capacity, the transfer of use from Waialee (which is in the adjacent Kawailoa Aquifer System Area) will free up water from Waialee for other uses. These Opana wells will be dedicated to the Board of Water Supply upon completion, so in a sense, the municipal supply alternative is being exercised.
2. Surface water – no available sources nearby.
3. Ditch systems – no nearby ditch systems.
4. Desalinization – not feasible.
5. Wastewater – though not being applied for in this application, treated wastewater is currently being used for golf course irrigation. Staff notes that wastewater is unsuitable for municipal and domestic potable needs.

(3) Interference with other existing legal uses

There are 10 other wells currently in use within 1 mile of the Opana wells. Of these, 4 are currently unused, 1 is sealed, 2 are municipal, 1 is a private irrigation well, and 2 are owned by Turtle Bay. There were no objections to this application. Pump tests have been run and show no interference with other wells. Therefore, pumpage is not expected to interfere with other wells.

(4) Public interest

Public interest is defined under §174C-2 - Declaration of policy, as follows:

"*(c) The state water code shall be liberally interpreted to obtain maximum beneficial use of the waters of the State for purposes such as domestic uses, aquaculture uses, irrigation and other agricultural uses, power development, and commercial and industrial uses. However, adequate provision shall be made for the protection of traditional and customary Hawaiian rights, the protection and procreation of fish and wildlife, the maintenance of proper ecological balance and scenic beauty, and the preservation and enhancement of waters of the State for municipal uses, public recreation, public water supply, agriculture, and navigation. Such objectives are declared to be in the public interest.*"

There have been no objections to this application. Further, the applicant states that the use is in the public interest because the Waialee wells at system capacity has created a moratorium for new uses of water in the North Shore area, and transfer of the source from Waialee to Opana for their needs frees up water in Waialee for other uses.

Therefore, this application meets the criteria to be in the public interest.

(5) State & county general plans and land use designations

The proposed uses are in the State Urban and AG districts, and the county zoning is A-1, B-1, Resort, P-1, and Ag-1.

Normal agency review includes:

1) the State's Department of Land and Natural Resources (DLNR) and its State Parks, Aquatic Resources, Historic Preservation, and Land Divisions; the Department of Health (DOH) with its Clean Water, Safe Drinking Water, and Wastewater Branches; the Department of Hawaiian Home Lands (DDHL), and Land Use Commission (LUC); and the Office of Hawaiian Affairs (OHA).
2) the Office of the Mayor, Department of Planning and Permitting, and the Board of Water Supply;

The City and County of Honolulu's Department of Planning and Permitting has replied that the uses are appropriate for the zoning.

Therefore, this application meets the criteria for state & county general plans and land use designations.

(6) County land use plans and policies

Again normal County review includes Office of the Mayor, Department of Planning and Permitting, and the Board of Water Supply. No objections have been made.

Therefore, this application meets the criteria for county land use plans and policies.

(7) Interference with Hawaiian home lands rights

All permits are subject to the prior rights of Hawaiian home lands. The Department of Hawaiian Home Lands (DHHL) and the Office of Hawaiian Affairs have reviewed this application and made no comments or objections. Further, standard water use permit conditions 3.g., 6., and 9.f. notify all water use permittees that their permits are subject to and cannot interfere with Hawaiian home land rights.

Therefore, this application will not interfere with Hawaiian home lands rights.

(8) Other issues

I. Chapter 343 – Environmental Assessment (EA) Compliance

EA Triggers
In accordance with §HRS 343-5(a), the applicant's proposed action does not trigger the need for an EA.

II. Allocation from the Waialee Wells

The applicant has stated that the current source of water for this application is the Board of Water Supply's Waialee system. The BWS has two wells in this system, Waialee I (state well no. 4101-07, WUP no. 323 for 0.339 mgd) and Waialee II (state well no. 4101-08, WUP no. 324 for 0.411 mgd). Approval of this Water Use Permit application would then show an apparent need to reduce the allocation of the Waialee wells to avoid double-counting.

The Koolau Loa Watershed Management Plan (excerpted in Exhibit 4), prepared for the Board of Water Supply in August 2009, identifies the Waialee system as the northernmost system that supplies the needs of the Koolauloa Aquifer System Area, including the applicant's current potable needs.

Regarding the Waialee system, the plan states that "although this system is connected to the BWS Waialua-Haleiwa system, water transfer between the areas is considered minimal." Barry Usagawa at the Board of Water Supply clarified that because of the low elevation of the Sunset Beach reservoir, there is a valve near Pupukea to isolate the systems. At times when the Waialee system goes down, this valve is opened. There are plans to abandon the Sunset Beach reservoir, which would allow the BWS to keep the valve always open, which will allow more constant transfer between the areas to meet shifting demands.

Regarding water demands in the Koolauloa Aquifer System Area, the plan indicates that on a mid-level scenario, the demand from Koolauloa sources (of which Waialee is considered a part of, though it is technically in the Kawailoa Aquifer System Area) will be remain constant at 1.9 mgd between 2010 and 2011.

Because a Watershed Management Plan has not yet been completed for the North Aquifer Sector, future demands for this sector are not known at this time. There is a current BWS moratorium on new water projects in the area, and Mr. Usagawa stated that the BWS recently denied an allocation request to a subdivision development near the Waialee system.

Pumpage records indicate that the Waialee system (state wells 4101-07 and 4101-08) is being pumped at rates very close to and at times over the allocation. Additionally, the Waialua (3405-01 and -02) wells are being overpumped.

Therefore, with the understanding that the current sources are being pumped near or over their allocations, that there may be future demands coming online in the North Aquifer Sector, and there will be regular exchange between the Koolauloa area and the North Aquifer Sector, staff does not recommend a reduction to the allocations for the Waialee wells at this time. However, the issue should be addressed, and a more appropriate time would be when this water use permit is transferred to the Board of Water Supply, and hopefully with the benefit of having the North (Aquifer) Watershed Management Plan.

RECOMMENDATION:

Staff recommends that the Commission approve the issuance of water use permit no. 927 to Turtle Bay Resort, LLC for the reasonable and beneficial use of 0.346 million gallons per day of potable water for domestic / municipal / industrial use from the Opana 1 & 3 Wells (Well No. 4100-04 & -05), subject to the standard water use permit conditions listed in Attachment B and the following special conditions:

1. In the event that the tax map key at the location of the water use is changed, the permittee shall notify the Commission in writing of the tax map key change within thirty (30) days after the permittee receives notice of the tax map key change.

2. When this permit is transferred to the Board of Water Supply, the allocations shall be examined and if warranted, a reduction in allocations to one or more of the sources should be applied for.

Respectfully submitted,

WILLIAM M. TAM
Deputy Director

Attachment(s):
A (Water Use Permit Detailed Information)
B (Water Use Permit Standard Conditions)

Exhibit(s):
1 (Location Map)
2 (Existing Water Use Permits and 12-Month Moving Average Withdrawal)
3 (applicant's Table 1: use calculations)
4 (Excerpt from Koo Lauloa Watershed Management Plan)

APPROVED FOR SUBMITTAL:

WILLIAM J. AILA, JR.
Chairperson

WATER USE PERMIT DETAILED INFORMATION

Source Information

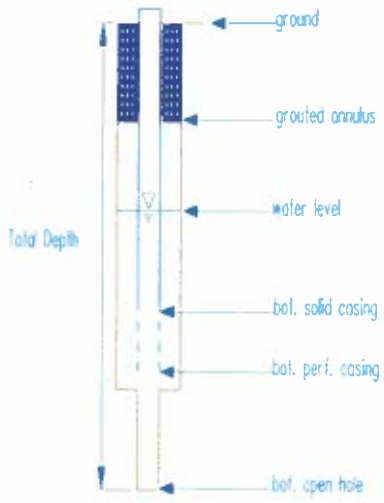
AQUIFER:	**Koolauloa** System, Windward Sector, Oahu
Sustainable Yield:	36 mgd
Existing Water Use Permits:	18.572 mgd
Available Allocation:	17.428 mgd
Total other pending applications:	0 mgd
This application:	0.346 mgd
WELL:	Opana 1 & 3 Wells (Well No. 4100-04 & -05)
Location:	Oahu, TMK: (1) 5-7-002:019

Opana 1 Well (4100-04)

Year Drilled:	1986
Casing Diameter:	12 in.
Elevations (msl = 0 ft.)	
Water Level:	not known ft.
Ground:	131 ft.
Bottom of Solid Casing:	-29 ft.
Bottom of Perforated:	not known ft.
Bottom of Open Hole:	-132 ft.
Total Depth:	263 ft.
Pump Capacity	700 gpm

Opana 1 Well (4100-04)

Year Drilled:	1990
Casing Diameter:	12 in.
Elevations (msl = 0 ft.)	
Water Level:	13.5 ft.
Ground:	125 ft.
Bottom of Solid Casing:	-29 ft.
Bottom of Perforated:	not known ft.
Bottom of Open Hole:	-173 ft.
Total Depth:	298 ft.
Pump Capacity	700 gpm



Use Information

Quantity Requested:	0.346 gallons per day
Existing Type of Water Use:	Domestic / Municipal / Industrial
Place of Water Use:	TMK: (1) 5-7-001: 013, 016, 022, 027, 029, 035

Koolauloa Aquifer System
Current 12-Month Moving Average Withdrawal (See Exhibit 2): 9.086 mgd

Nearby Surrounding Wells and Other Registered Ground Water Use

There are 10 other wells within a mile of the well (see Exhibit 1). Of these, 4 are currently unused, 1 is sealed, 2 are municipal, 1 is a private irrigation well, and 2 are owned by Turtle Bay.

Public Notice

In accordance with HAR §13-171-17, a public notice was published in the Honolulu Advertiser on October 7, 2011 and October 14, 2011 and a copy of the notice was sent to the Office of the Mayor. Copies of the completed application were sent to the Board of Water Supply, Department of Planning and Permitting, Department of Health, Department of Hawaiian Home Lands, Office of Hawaiian Affairs, the various divisions within the Department of Land and Natural Resources, and other interested parties for comments. Written comments and objections to the proposed permit were to be submitted to the Commission by October 28, 2011.

Objections

The public notice specifies that an objector meet the following requirements: (1) state property or other interest in the matter; (2) set forth questions of procedure, fact, law, or policy, to which objections are taken; (3) state all grounds for objections to the proposed permits, (4) provide a copy of the objection letter(s) to the applicant, and (5) submit objections meeting the previous requirements to the Commission by October 28, 2011.

No objections have been filed.

Briefs in Support

Responses to objections, or briefs in support, regarding the application are required to be filed with the Commission ten (10) days after an objection is filed and, presumably, copies are served to the applicant. No briefs in support were filed with the Commission.

STANDARD WATER USE PERMIT CONDITIONS

1. The water described in this water use permit may only be taken from the location described and used for the reasonable beneficial use described at the location described above. Reasonable beneficial uses means "the use of water in such a quantity as is necessary for economic and efficient utilization which is both reasonable and consistent with State and County land use plans and the public interest." (HRS § 174C-3)

2. The right to use ground water is a shared use right.

3. The water use must at all times meet the requirements set forth in HRS § 174C-49(a), which means that it:

   a. Can be accommodated with the available water source;
   b. Is a reasonable-beneficial use as defined in HRS § 174C-3;
   c. Will not interfere with any existing legal use of water;
   d. Is consistent with the public interest;
   e. Is consistent with State and County general plans and land use designations;
   f. Is consistent with County land use plans and policies; and
   g. Will not interfere with the rights of the Department of Hawaiian Home Lands as provided in section 221 of the Hawaiian Homes Commission Act and HRS § 174C-101(a).

4. The ground water use here must not interfere with surface or other ground water rights or reservations.

5. The ground water use here must not interfere with interim or permanent instream flow standards. If it does, then:

   a. A separate water use permit for surface water must be obtained in the case an area is also designated as a surface water management area;
   b. The interim or permanent instream flow standard, as applicable, must be amended.

6. The water use authorized here is subject to the requirements of the Hawaiian Homes Commission Act, as amended, if applicable.

7. The water use permit application and submittal, as amended, approved by the Commission at its December 21, 2011 meeting are incorporated into this permit by reference.

8. Any modification of the permit terms, conditions, or uses may only be made with the express written consent of the Commission.

9. This permit may be modified by the Commission and the amount of water initially granted to the permittee may be reduced if the Commission determines it is necessary to:

   a. protect the water sources (quantity or quality);
   b. meet other legal obligations including other correlative rights;

c. insure adequate conservation measures;
d. require efficiency of water uses;
e. reserve water for future uses, provided that all legal existing uses of water as of June, 1987 shall be protected;
f. meet legal obligations to the Department of Hawaiian Home Lands, if applicable; or
g. carry out such other necessary and proper exercise of the State's and the Commission's police powers under law as may be required.

Prior to any reduction, the Commission shall give notice of its proposed action to the permittee and provide the permittee an opportunity to be heard.

10. An approved flowmeter(s) must be installed to measure monthly withdrawals and a monthly record of withdrawals, salinity, temperature, and pumping times must be kept and reported to the Commission on Water Resource Management on forms provided by the Commission on a monthly basis (attached).

11. This permit shall be subject to the Commission's periodic review of the **Koolauloa** Aquifer System's sustainable yield. The amount of water authorized by this permit may be reduced by the Commission if the sustainable yield of the **Koolauloa** Aquifer System, or relevant modified aquifer(s), is reduced.

12. A permit may be transferred, in whole or in part, from the permittee to another, if:

a. The conditions of use of the permit, including, but not limited to, place, quantity, and purpose of the use, remain the same; and
b. The Commission is informed of the transfer within ninety days.

Failure to inform the department of the transfer invalidates the transfer and constitutes a ground for revocation of the permit. A transfer which involves a change in any condition of the permit, including a change in use covered in HRS § 174C-57, is also invalid and constitutes a ground for revocation.

13. The use(s) authorized by law and by this permit do not constitute ownership rights.

14. The permittee shall request modification of the permit as necessary to comply with all applicable laws, rules, and ordinances which will affect the permittee's water use.

15. The permittee understands that under HRS § 174C-58(4), that partial or total nonuse, for reasons other than conservation, of the water allowed by this permit for a period of four (4) continuous years or more may result in a permanent revocation as to the amount of water not in use. The Commission and the permittee may enter into a written agreement that, for reasons satisfactory to the Commission, any period of nonuse may not apply towards the four-year period. Any period of nonuse which is caused by a declaration of water shortage pursuant to section HRS § 174C-62 shall not apply towards the four-year period of forfeiture.

16. The permittee shall prepare and submit a water shortage plan within 30 days of the issuance of this permit as required by HAR § 13-171-42(c). The permittee's water shortage plan shall identify what the permittee is willing to do should the Commission declare a water shortage in the **Koolauloa** Ground Water Management Area.

17. The water use permit shall be subject to the Commission's establishment of instream standards and policies relating to the Stream Protection and Management (SPAM) program, as well as legislative mandates to protect stream resources.

18. Special conditions in the attached cover transmittal letter are incorporated herein by reference.

19. The permittee understands that any willful violation of any of the above conditions or any provisions of HRS § 174C or HAR § 13-171 may result in the suspension or revocation of this permit.

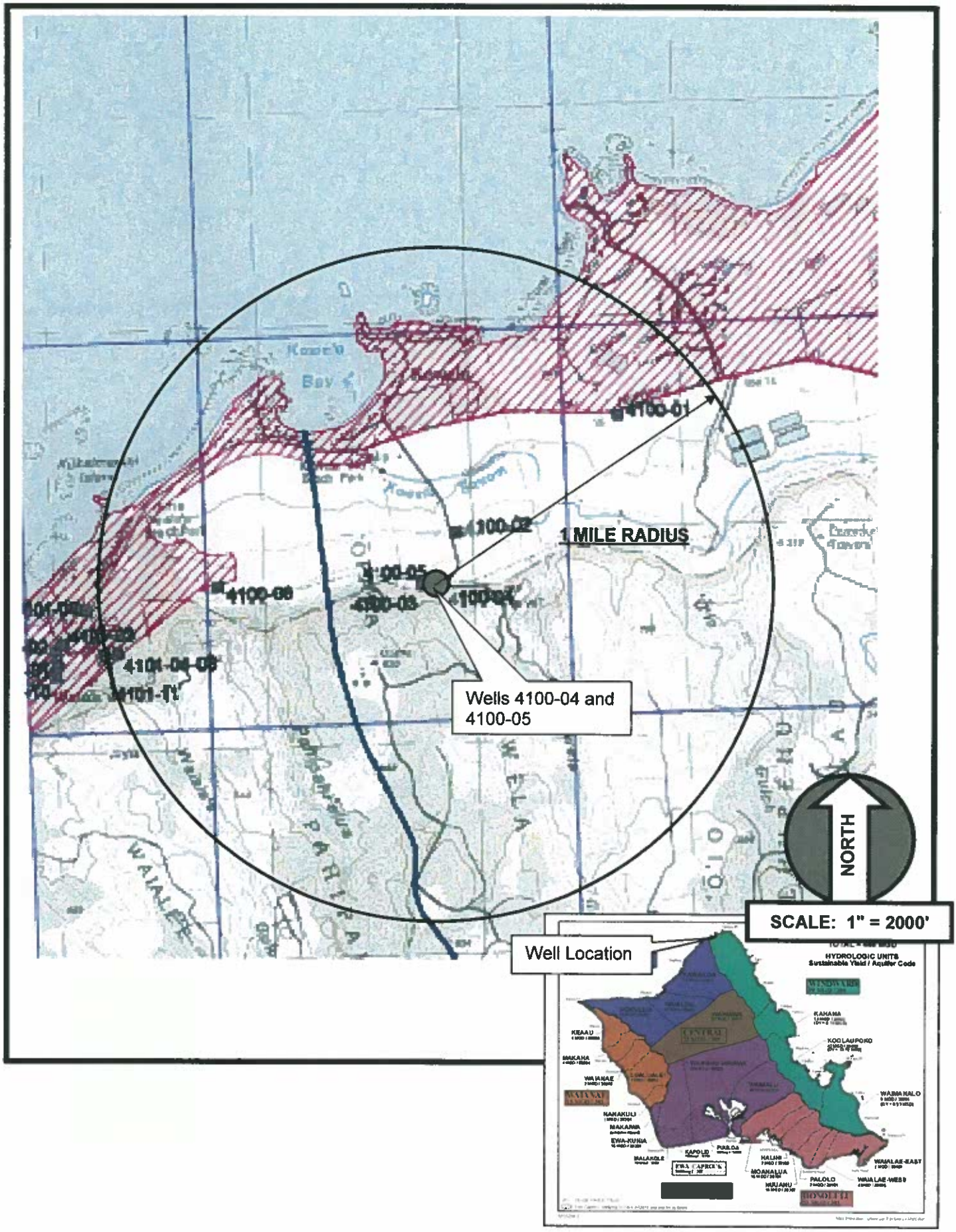


EXHIBIT 1: LOCATION MAP

Aquifer System Water Use Permit Index *(non-salt-caprock-dike)*

ISLAND OF OAHU

WUP No	Approved	Permittee	Well No.	Well Name	WUP (mgd)	12-MAV (mgd)
WMA Aquifer System: KOOLAULOA				**Sustainable Yield =**	36	
224	9/1/1993	HOLT, LEMON	3654-02	LW HOLT	0.002	N/R
233	12/8/1993	CAMPBELL ESTATE	4057-11	SUGAR MILL PUMP	0.028	N/R
UPERCEDED ~~234~~	~~12/8/1993~~	~~CAMPBELL ESTATE~~	~~4157-04~~	~~PUMP 15 (ARMY)~~		
246	12/8/1993	STATE DOA	4057-01	PUMP 1	0.307	0.426 (1/06)
313	12/8/1993	HANOHANO ENTERPRISES, INC	3553-01	HANOHANO	0.432	0.000 (1/07)
314	1/26/1994	NIHIPALI, GEORGE N.	3855-12	NIHIPALI	0.009	N/R
322	1/26/1994	HONOLULU BWS	4057-15	KAHUKU BATTERY	0.600	0.391 (10/06)
	1/26/1994	HONOLULU BWS	4057-16	KAHUKU BATTERY		
356	1/25/1995	E.L.C. FOUNDATION	3755-03	HAUULA	0.019	N/R
382	12/7/1998	HAWAII RESERVES, INC.	3755-06	TRUCK FARM	0.142	0.025 (7/09)
383	12/7/1998	HAWAII RESERVES, INC.	3855-04	WELFARE FARM	0.091	0.049 (7/09)
385	12/7/1998	POLYNESIAN CULTURAL CEN.	3855-09	PCC LAGOON WELL	0.568	N/R
386	12/7/1998	HAWAII RESERVES, INC.	3856-04	QUARRY WELL D	0.036	0.008 (7/09)
389	12/7/1998	HAWAII RESERVES, INC.	3956-05	EGG FARM	0.001	N/R
486	10/22/1997	HONOLULU BWS	3453-06	PUNALUU III	1.327	0.777 (1/07)
	10/22/1997	HONOLULU BWS	3453-07	PUNALUU III		
529	12/15/2004	KAPAKA FARM	3554-01	KAPAKA FARM 1	0.038	0.018 (6/09)
530	12/15/2004	KAPAKA FARM	3654-03	KAPAKA FARM 3	0.190	0.107 (6/09)
571	1/26/1994	HONOLULU BWS	3554-04	KALUANUI	1.093	1.066 (12/06)
	1/26/1994	HONOLULU BWS	3554-05	KALUANUI		
	1/26/1994	HONOLULU BWS	3554-06	KALUANUI		
734	12/8/1993	HAWAII RESERVES, INC.	4057-10	PUMP 12-A	1.200	0.000 (5/06)
735	12/8/1993	HAWAII RESERVES, INC.	4056-01	KAWANANAKOA	0.576	0.000 (5/06)
736	12/8/1993	HAWAII RESERVES, INC.	3956-01	MALAEKAHANA (KP7)	0.062	0.005 (7/09)
739	12/7/1998	LAIE WATER CO., INC.	3855-06	CAMPUS WELL	1.375	0.236 (6/09)
	12/7/1998	LAIE WATER CO., INC.	3855-07	CERAMICS WELL		
	12/7/1998	LAIE WATER CO., INC.	3855-08	LIBRARY WELL		
	12/7/1998	LAIE WATER CO., INC.	3856-05	QUARRY E		
	12/7/1998	LAIE WATER CO., INC.	3856-06	QUARRY F		
746	8/16/2006	Hawaii Reserves Inc.	3856-07	Prawn Farm	0.171	0.086 (6/09)
747	8/16/2006	Hawaii Reserves, Inc.	3755-04	Laie Maloo	0.039	0.000 (6/09)
753	9/19/2001	U.S. Fish and Wildlife Service	4157-05	Kii Wildlife Refuge 1	1.000	0.000 (9/09)
	9/19/2001	U.S. Fish and Wildlife Service	4157-06	Kii Wildlife Refuge 2		
	9/19/2001	U.S. Fish and Wildlife Service	4157-07	Kii Wildlife Refuge 3		
	9/19/2001	U.S. Fish and Wildlife Service	4157-13	Kii Wildlife Refuge 4		

EXHIBIT 2: EXISTING WUPS AND 12-MAVS

WUP No	Approved	Permittee	Well No.	Well Name	WUP (mgd)	12-MAV (mgd)
756	8/17/2005	Ming Dynasty Fish Co.	4258-04	Amor RCA Brackish	0.010	N/R
757	11/9/2005	Diversified Ag Promotions LLC	4158-12	Kahuku Air Base	0.300	0.099 (10/05)
	11/9/2005	Diversified Ag Promotions LLC	4158-13	Kahuku Air Base		
780	8/3/1994	Serenity Park LLC	3957-01	Pump 3	1.244	0.030 (4/09)
	3/1/1995	Serenity Park LLC	3957-03	Pump 3A		
782	5/16/2000	Serenity Park LLC	4057-07	Pump 12	0.300	0.332 (4/09)
887	6/18/2003	Turtle Bay Mauka Lands, LLC	4159-02	Pump 2A		
891	12/8/1993	U.S. Fish & Wildlife Service	4157-04	Pump 15	1.517	N/R
913	7/22/2011	Honolulu BWS	3655-02	Maakua	1.120	0.918 (1/07)
914	7/22/2011	Honolulu BWS	3553-02	Punaluu 1	0.190	0.000 (1/07)
915	7/22/2011	Honolulu BWS	3553-03	Punaluu II	4.405	4.349 (12/03)
	7/22/2011	Honolulu BWS	3553-04	Punaluu II		
	7/22/2011	Honolulu BWS	3553-06	Punaluu II		
	7/22/2011	Honolulu BWS	3553-07	Punaluu II		
	7/22/2011	Honolulu BWS	3553-08	Punaluu II		
	7/22/2011	Honolulu BWS	3554-03	Punaluu II		
916	7/22/2011	Honolulu BWS	3655-01	Hauula	0.180	0.164 (1/07)

Summary for 'SYSTEM' = KOOLAULOA (52 detail records)

Totalling *18.572* 9.086

Available *17.428*

EXHIBIT 3: APPLICANT'S QUANTITY JUSTIFICATION

TABLE 1

A Category of Use	B TMK	C State Land Use	D CDUP Req'd ?	E County Zoning	F SMAP Req'd?	G Units	H GPD/Unit	I Quantity (GPD)	J Justification
DOM	5-7-1:29	Urban	No	A-1	Yes 10/1/86	200	400gpd/ unit	80,000	Existing Kuilima Estates West
DOM	5-7-1:27	Urban	No	A-1	Yes 10/1/86	168	400 gpd unit	67,200	Existing Kuilima Estates East
DOM	5-7-1:13	Urban	No	B-1, Resort	Yes 10/1/86	57	400 gpd/ unit	22,800	Existing Ocean Villas
DOMHOT	5-7-1:13	Urban	No	B-1, Resort	Yes 10/1/86	443	350 gpd/ unit	155,050	Existing Turtle Bay Hotel and Cottages
DOMNCB	5-7-1:16	Urban	No	B-1, P-2, Resort	Yes 10/1/86			7,500*	Existing Palmer golf course restrooms (2) and maintenance facility
DOMNCB	5-7-1:22	Urban	No	B-1, P-2, Resort	Yes 10/1/86			5,900*	Existing Fazio clubhouse, golf course restrooms, golf course maintenance facility
INDOTH	5-7-1:35	AG	No	Ag-1	Yes 10/1/86			7200*	Existing sewage treatment plant
TOTAL								**345,650**	

*Based on average current metered usage.

ES.5 EXISTING USE AND FUTURE WATER DEMANDS

Existing Water Use

The three main sources of water in Ko'olau Loa are ground, surface, and recycled water *(Figure ES.3)*. Groundwater supplies most of the Ko'olau Loa residential, commercial and agricultural needs and supplies water to Kailua, Kāne'ohe and Waimānalo in Ko'olau Poko. Surface water provides agricultural irrigation water for Punalu'u and Kahana Valleys in Ko'olau Loa. Recycled water supplies some of the district's irrigation water needs in Lā'ie and at Turtle Bay.

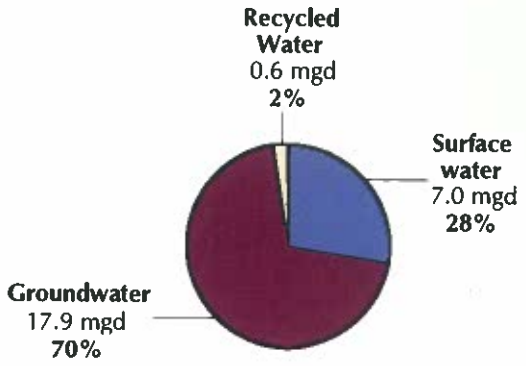


Figure ES.3 Ko'olau Loa District Water Sources (2000)

The Board of Water Supply delivery of drinking quality water is via three separate BWS systems. At the north end of Ko'olau Loa is the BWS Waiale'e system that supplies the Kawela area of Ko'olau Loa. Waiale'e Wells I and II are the water sources for this end of the system. Although this system is connected to the BWS Waialua-Hale'iwa system, water transfer between the areas is considered minimal. The BWS Kahuku system supplies users in Kahuku and Mālaekahana and is not connected to other BWS systems. The Kahuku wells are the water source for this system. To the south of Lā'ie, the BWS system supplies water for both Ko'olau Loa communities of Hau'ula, Punalu'u, Kahana and Ka'a'awa and Ko'olau Poko (Kailua, Kāne'ohe and Waimānalo).

Lā'ie Water Company is the provider of potable water to the Lā'ie community via their privately owned and operated system.

Future Water Demands

Water demands were projected through the year 2030. These projections provide an estimate of the amount of water needed over the next 25 years, and point to periods when increased demand may require infrastructure improvements.

Three scenarios of future water demand estimates are calculated. The domestic water usage is based upon the City and County of Honolulu Department of Planning and Permitting and State Department of Business, Economic Development and Tourism forecasts of population, jobs, and/or land use in five year increments from the year 2000 through 2030. Using these scenarios also fulfills the Statewide Framework's directive that, "*...demand forecasts shall be consistent with county land use plans, development plans and/or community plans.*" The mid/policy demand

scenario is consistent with the Ko'olau Loa Sustainable Communities Plan. Three distinct scenarios were developed for Ko'olau Loa *(Figure ES.4)*. The water demands include the nearly 8 mgd supplied to Kailua, Kāne'ohe, and Waimānalo in Ko'olau Poko District.

Table ES.1 Projected Demands

USE/SCENARIO	2000	2005	2010	2015	2020	2025	2030
Non-Potable Ag – Low Scenario	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Non-Potable Ag – Mid Scenario	13.4	13.9	14.5	15.2	15.8	16.6	17.4
Non-Potable Ag – High Scenario	13.4	14.2	15.1	16.1	17.2	18.4	19.8
Non-Potable Other – Low Scenario	1.7	2.1	2.1	2.1	2.4	2.8	3.1
Non-Potable Other – Mid Scenario	1.7	2.1	2.2	2.2	2.5	2.8	3.2
Non-Potable Other – High Scenario	1.7	2.3	2.4	2.5	2.9	3.3	3.7
Lā'ie Water – Low Scenario	1.0	1.1	1.2	1.2	1.3	1.3	1.4
Lā'ie Water – Mid Scenario	1.0	1.2	1.3	1.4	1.5	1.5	1.6
Lā'ie Water – High Scenario	1.0	1.2	1.4	1.5	1.6	1.7	1.8
Non-BWS Subtotal – Low Scenario	**16.1**	**16.6**	**16.7**	**16.7**	**17.1**	**17.5**	**17.9**
Non-BWS Subtotal – Mid Scenario	**16.1**	**17.2**	**18**	**18.8**	**19.8**	**20.9**	**22.2**
Non-BWS Subtotal – High Scenario	**16.1**	**17.7**	**18.9**	**20.1**	**21.7**	**23.4**	**25.3**
BWS Ko'olau Loa – Low Scenario	1.5	1.6	1.7	1.7	1.7	1.8	1.8
BWS Ko'olau Loa – Mid Scenario	1.5	1.6	1.9	1.9	1.9	2.0	2.1
BWS Ko'olau Loa – High Scenario	1.5	1.8	2.0	2.3	2.6	2.9	3.1
BWS export to Ko'olau Poko and North Shore – Low Scenario	8.6	8.6	8.6	8.6	8.6	8.6	8.6
BWS export to Ko'olau Poko and North Shore – Mid Scenario	8.6	8.6	8.6	8.6	8.6	8.6	8.6
BWS export to Ko'olau Poko and North Shore – High Scenario	8.6	8.6	8.6	8.6	8.6	8.6	8.6
BWS Subtotal – Low Scenario	**10.1**	**10.2**	**10.3**	**10.3**	**10.3**	**10.4**	**10.4**
BWS Subtotal – Mid Scenario	**10.1**	**10.2**	**10.5**	**10.5**	**10.5**	**10.6**	**10.7**
BWS Subtotal – High Scenario	**10.1**	**10.4**	**10.6**	**10.9**	**11.2**	**11.5**	**11.7**

TOTAL – LOW SCENARIO	**26.1**	**26.8**	**27.0**	**27.1**	**27.4**	**27.9**	**28.4**
TOTAL – MID SCENARIO	**26.1**	**27.4**	**28.5**	**29.3**	**30.3**	**31.5**	**32.9**
TOTAL – HIGH SCENARIO	**26.1**	**28.1**	**29.5**	**31.0**	**32.9**	**34.9**	**37.0**

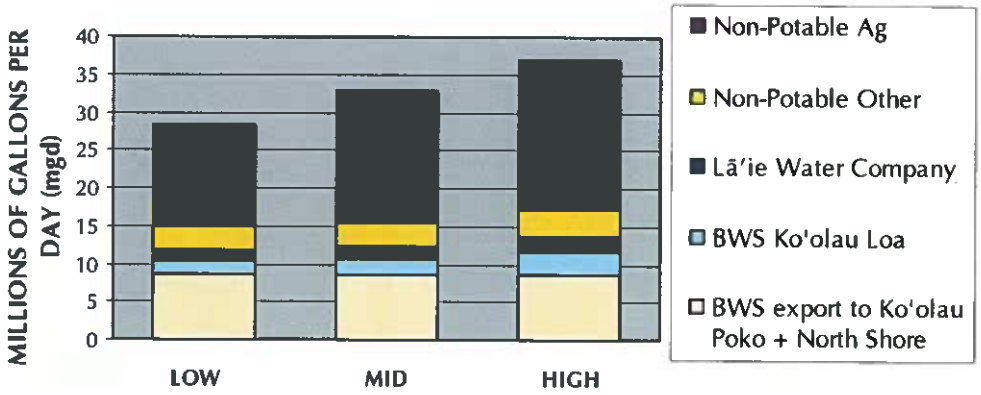


Figure ES.4 Water Projection Scenarios Summary - 2030 Projected Demand Low-Mid-High Comparisons

ES.6 MEETING FUTURE DEMANDS

Potable water demands should be met with potable water and non-potable water needs with non-potable water. However, in Ko'olau Loa, and around O'ahu, potable water is far more abundant than non-potable water, so potable water is commonly used to meet non-potable demand.

The challenge is to find cost effective alternatives to groundwater that can be used for non-potable / lower water quality demands to ensure ample high quality groundwater remains for existing and future use. The overall strategy for Ko'olau Loa is to develop appropriate and available alternatives.

Diversification in water supply resources is beneficial for increasing the reliability of supply. For example, recycled water provides a relatively drought resistant irrigation water supply. Recycled water, water conservation and agriculture water loss minimization are the alternatives for Ko'olau Loa.

Water Conservation

Water conservation reduces water loss and makes available more water for use, so that less groundwater or surface water is needed to meet existing demands. Water conservation also increase the existing system capacity for future needs.

The BWS infrastructure water loss program of leak detection and repair focuses on reducing the amount of system leakage. The BWS consumer programs focus on a variety of areas from changing behaviors to installation of water saving devices to reduce per capita demand.

The water conservation goal for Ko'olau Loa due to the wet climate is a 5% reduction in forecasted demand. The water conservation programs (such as rebates) used to accomplish this are listed in the project description *(Project 6d)*. Water conservation is an ongoing effort that will continue as long as water is supplied to O'ahu users.

Agricultural Water Loss Minimization

Water conservation, practices, devices, and repairs to reduce water usage are a responsibility of everyone using water. Agricultural water loss minimization can mean less ground or surface water is then needed.

Increased Recycled Water

Opportunities for recycled water in Ko'olau Loa are limited to areas where sewer collection systems and treatment plants exist, and encounter fiscal barriers when compared to groundwater. To increase usage of this resource, a more competitive pricing structure would be needed. An alternative to pricing would be mandating the use of recycled water where available. However, higher prices would likely place a burden on farmers operating in already tenuous situations. Government agencies could mandate themselves to use recycled water where available but would need to fund the associated capital and operating costs. Private developments creating non-potable demand will be required to investigate, develop and use recycled water.